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PROVISIONAL SPECIFICATION.

An Improved Method of Manufacturing from Starch or Starchy Substances a Material suitable for Use in Brewing and for other purposes.

We, RICHARD CHARLES GARTON of Southampton Wharf, Battersea in the County of Surrey, Saccharum Manufacturer, and CHARLES HENRY MEYER of Commercial Road, Shepton Mallet in the County of Somerset, Brewer, do hereby declare the nature of this invention to be as follows :—

This invention has reference to the treatment of starch or starchy substances so as to manufacture therefrom sugar suitable for use in brewing and for other purposes.

With this object we mix the starch or starchy material in a powdered or reduced state with acid and we then subject the moistened powder to steam pressure whereby the starch is converted into glucose or other sugar.

In carrying out our invention we find that suitable proportions of the starch, and acid are approximately 100 parts by weight (dry) of starch and from ¼ to 4 parts by weight of acid of a specific gravity of 1·840, sulphuric acid being used by preference. We make or place this mixture in a close vessel and subject it to a steam pressure equivalent to a temperature of preferably about 270° to 300° Fahrenheit which we consider the best temperature for safe and easy working but a higher temperature can be employed and the process thereby facilitated. We maintain the temperature until practically all the starch is converted into glucose or other sugar that is to say until a sample tested by alcohol shows very little dextrin in solution.

Dated this 17th day of December 1894.

J. C. MEWBURN & ELLIS,
55 and 56 Chancery Lane, London, Patent Agents.

COMPLETE SPECIFICATION.

An Improved Method of Manufacturing from Starch or Starchy Substances a Material suitable for Use in Brewing and for other purposes.

We, RICHARD CHARLES GARTON of Southampton Wharf, Battersea, in the County of Surrey, Saccharum Manufacturer, and CHARLES HENRY MEYER of Commercial Road Shepton Mallet in the County of Somerset, Brewer, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement :—

This invention has reference to the treatment of starch or starchy substances so as to manufacture therefrom sugar suitable for use in brewing and for other purposes.

[*Price* 8*d*.]

Method of Manufacturing from Starch a Material suitable for Use in Brewing, &c.

In the conversion of starch into glucose it has hitherto been customary to mix the starch with a large quantity of water, making it into a milk of starch; then to put the same under steam pressure with sulphuric or other acid, and after neutralization and filtration to evaporate the water until the necessary concentration is obtained.

According to this invention we eliminate as far as practicable water, and we only add sufficient water to ensure intimate contact of the acid with the starch and submit the starch in this condition to the action of steam pressure.

By this invention we are enabled to apply the necessary heat for conversion at less cost: and entirely obviate the necessity for the usual evaporation of water after the converting process.

With this object we mix the starch or starchy material in a powdered or reduced state with dilute acid and we then subject the powder thus slightly moistened to steam pressure, whereby the starch is converted into glucose or other sugar, the starch or starchy material being maintained in a powdered state until converted by the action of the steam into a heavy gravity syrup.

In carrying out our invention we find that suitable proportions of the starch and acid are approximately 100 parts by weight of dry starch, and from ¼ to 4 parts by weight of acid of a specific gravity of 1·840, sulphuric acid being used by preference. In carrying out this part of the process we place the starch or starchy material in a suitable machine where it is stirred, whilst the acid solution is sprinkled thereon until the whole becomes moistened. The moistened powder being still in a powdered form is transferred by any suitable means to a closed vessel or converter and subjected to a steam pressure equivalent to a temperature of preferably about 270° to 300° Fahrenheit, which we consider the best temperature for safe and easy working, but a higher temperature can be employed and the process thereby facilitated. We maintain the temperature until practically all the starch is converted into glucose or other sugar, that is to say until a sample tested by alcohol shows very little dextrin in solution.

The result of this process is a heavy gravity syrup, which can be neutralized, filtered and treated in the usual way. We obtain the syrup in a still more concentrated form by using dry or superheated steam.

The quantity of acid used should be preferably within the limits above mentioned; but such acid has to be diluted to prevent charring of the starchy material and to ensure equal distribution with the starchy material. The specific gravity of the solution at which it is found desirable to work varies from 1·004 to 1·060, and the quantity of acid used between these limits of gravity is 40 *per cent.* of the weight of dry starch used.

The amount of water introduced during the manufacture both in the acid and in the form of steam, is the amount to be found in the syrup when the converting process is completed. The syrup which is the result of this process without evaporation is in the same state of concentration as is usual after the first evaporation in the ordinary process of manufacture.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. In the manufacture of glucose and the like from starch or starchy substances, the process of submitting dry starch to the action of dilute acid, maintaining the starch in a powdered form without excess of water prior to its conversion into syrup substantially as hereinbefore described.

2. In the manufacture of glucose and the like from starch or starchy substances, the improved process consisting of treating starch or starchy substances with dilute acid and maintaining the starch in a powdered form, and converting the same by means of steam into a highly concentrated syrup without evaporation, substantially as hereinbefore described.

3. The production of a highly concentrated syrup without evaporation by treating starch or starchy substances with dilute acid, converting the same by means of steam pressure into a heavy gravity syrup, neutralizing the acid and filtering the liquid, substantially as described.

Dated this 16th day of September 1895.

J. C. MEWBURN & ELLIS,
55 and 56 Chancery Lane, London, Chartered Patent Agents.

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